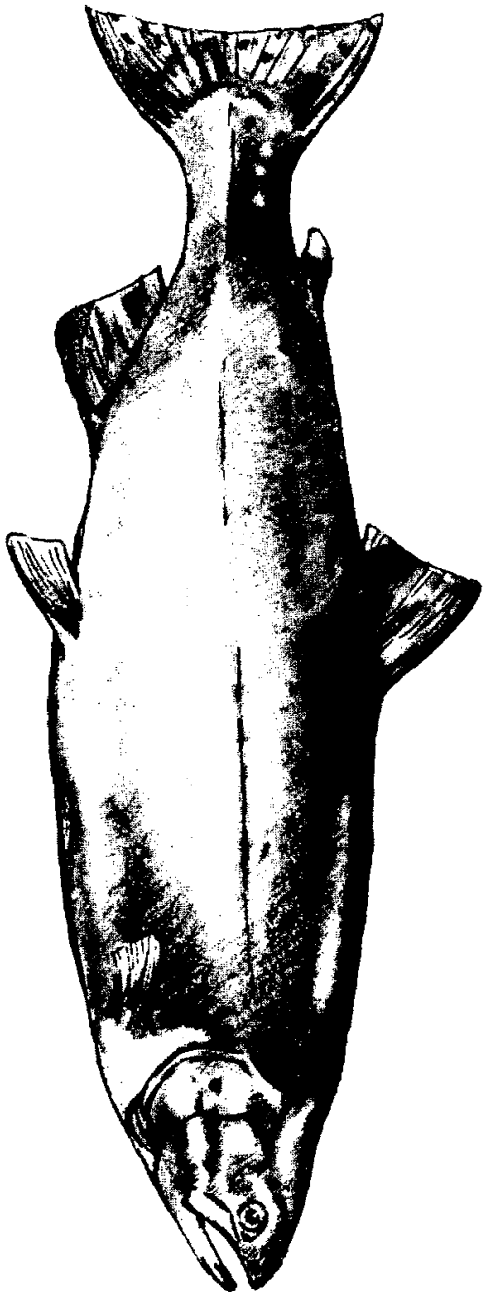


Chapter IV—Dam Retention Alternative

DESCRIPTION

This chapter discusses the Dam Retention alternative to resolve fish passage problems at Savage Rapids Dam.

The Dam Retention Alternative includes two parts (1) modification of Savage Rapids Dam, improvement of the headworks of Gravity Canal, and replacement or rehabilitation of the aging hydraulic turbines, pumps, and associated facilities; and (2) removal of the existing fish ladders and screens and replacement with facilities that meet current NMFS criteria.

ACCOMPLISHMENTS

The Dam Retention Alternative focuses on the river area from just downstream to just upstream from Savage Rapids Dam. The accomplishments are confined to (1) fish passage improvement and accompanying harvest potential of salmon and steelhead and (2) extension of the useful life of irrigation diversion facilities. In addition there would be temporary effects associated with construction.

With the Dam Retention Alternative, annual salmon and steelhead escapement past Savage Rapids Dam would increase about 17 percent. For this analysis, Reclamation estimates that the increased escapement would be 20,700 fish and the associated increase in harvest would be about 68,100 fish. The ODFW recently undertook an analysis of potential anadromous fish escapement with the Dam Retention Alternative. Their analysis is based on more recent effort to model fish mortality associated with the dam and uses updated information on life cycle and abundance of the fish species. The results of high and low estimates of increased anadromous fish escapement range from 5,500 fish to 29,400 fish (see attachment D) Since the earlier estimate falls within this range, Reclamation did not recalculate the monetary benefits based on the new ODFW numbers.

Improved fish passage would also benefit resident fish which could more easily move up and downstream to find suitable habitat as flow conditions change.

The useful life of the irrigation diversion facilities that pump water to the Tokay Canal/Evans Creek Lateral system and to the South Highline Canal/Savage Lateral system would be extended for at least 50 years.

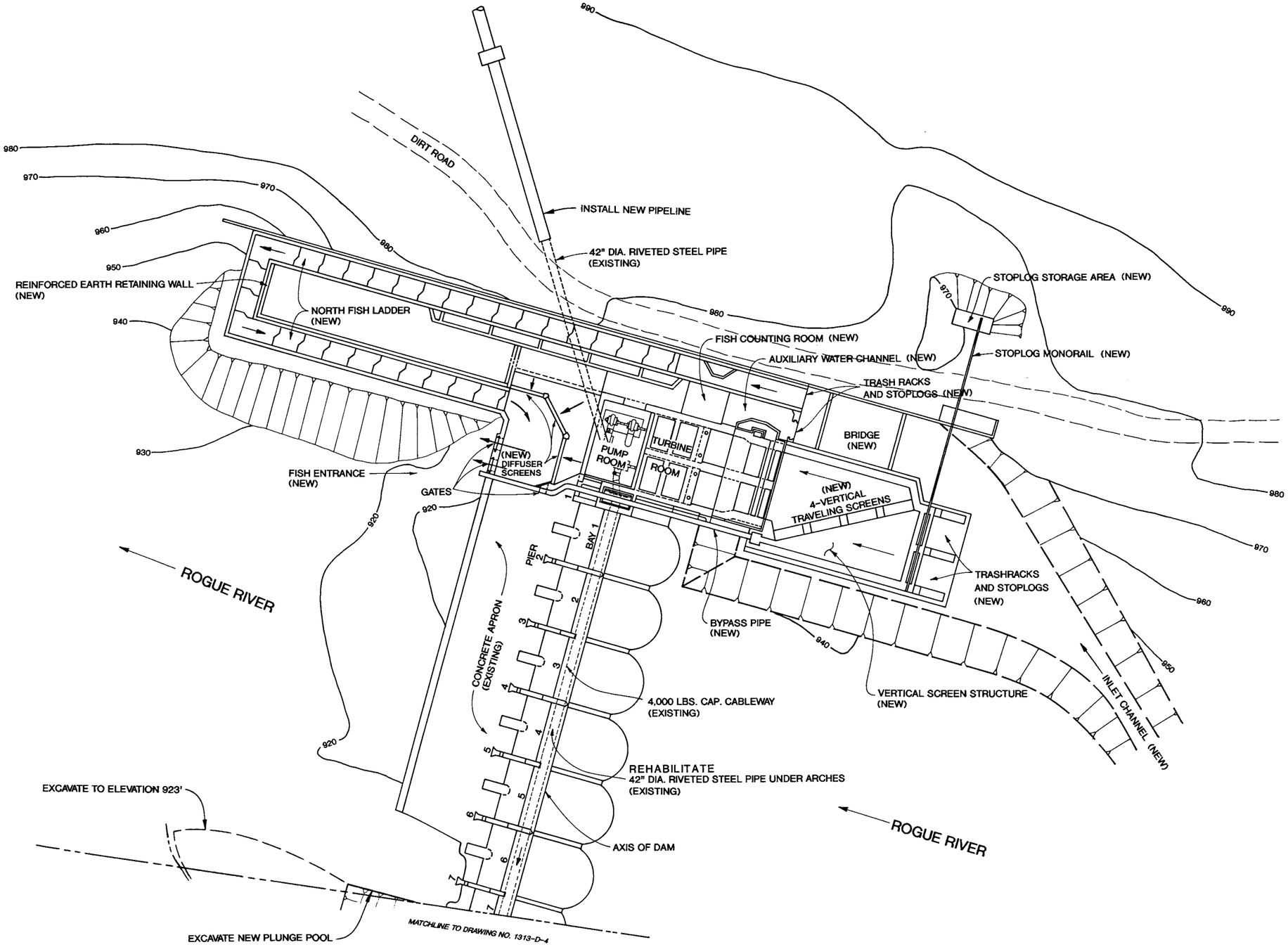
This alternative does not affect water rights, amount and timing of water diversions, annual river flow, operation of the pool formed by Savage Rapids Dam, ground water, current recreation activities, or other natural resources and uses other than those identified above.

FACILITIES

Savage Rapids Dam would be modified, fish passage and protective facilities and the pumps and turbines would be replaced (see drawing numbers 1313-D-3 and 1313-D-4). Overall designs for the Dam Retention Alternative were made during the course of this study which was initiated in 1989; however, some specific features are based on older designs. These designs are adequate for authorization but not for specifications or construction. Final designs would be completed in consultation with NMFS, USFWS, and ODFW during preconstruction.

Basic features include the following:

- Replace north and south fish ladders.
- Replace fish screens.
- Construct a juvenile fish counting facility.
- Excavate a plunge pool immediately downstream from the center of the dam and reshape portions of the south side of the river channel below the dam.
- Modify bays 8 and 9 at the center of the dam to direct overflows into the plunge pool.
- Replace existing turbines and pumps.
- Replace existing radial gates and gate controls.
- Improve public access to the south fish ladder for viewing migrating fish including:
    - Construct a safe intersection between the access road and State Highway 99.
    - Pave the existing parking lot.
    - Construct a viewing platform with handicap access to replace the existing viewing platform.



NOTES:

ONLY MAJOR IMPROVEMENT ITEMS ARE SHOWN.
EXISTING NORTH FISH LADDER IS NOT SHOWN.
EXISTING STOPLOG MONORAIL IS NOT SHOWN.
CONTOUR AND EXCAVATION LINES ARE APPROXIMATE.
(1) EXISTING FISH SCREENS WILL BE REMOVED AND REPLACED WITH DIAGONAL SCREENS.

10 0 10 20 30 40 50
SCALE OF FEET

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

GRANTS PASS DIVISION
ROGUE RIVER BASIN PROJECT, OREGON

SAVAGE RAPIDS DAM
NORTH BANK
FISH PASSAGE IMPROVEMENTS

DENVER, COLORADO JANUARY 1994

DRAWING NO. 1313-D-3

NOTES:

ONLY MAJOR IMPROVEMENT ITEMS ARE SHOWN.
EXISTING SOUTH FISHWAY IS NOT SHOWN.
CONTOUR AND EXCAVATION LINES ARE APPROXIMATE.

ROGUE RIVER
EXCAVATE TO ELEVATION 933'
MATCHLINE TO DRAWING NO. 1313-D-3
REHABILITATE 42" DIA. RIVETED STEEL PIPE UNDER ARCHES
NEW PLUNGE POOL ELEVATION 923'
ROGUE RIVER
EXISTING DIVERSION CHANNEL
MODIFY STOPLOGS AND INSTALL OVERFLOW SHIELDS BAY 8 & 9
REPLACE EXISTING RADIAL GATES IN BAYS 10 AND 11.
EXCAVATE TO ELEVATION 933
4000 LBS. CAP. CABLEWAY (EXISTING)
AXIS OF DAM
42" DIA. CONCRETE PIPE (EXISTING)
FISH ENTRANCE
SOUTH FISH LADDER (NEW)
GATES
EXCAVATE INLET CANAL
GRAVITY CANAL
RELOCATED ACCESS BRIDGE
(NEW) JUVENILE TRAPPING FACILITY
BYPASS PIPE (NEW)
PUBLIC VIEWING (NEW)
EXISTING CONCRETE SLAB
SLIDE GATES (NEW)
TRASHRACK (NEW)
STOPLOGS (NEW)
5'-5" DIA. X 12' LONG DRUM SCREENS (NEW)
STOPLOGS
GRAVITY CANAL
TRASHRACK (NEW)
TWO EXISTING SLIDE GATES
ENLARGED PARKING LOT
GRAVITY CANAL ROTARY DRUM STRUCTURE (NEW)
INSTALL NEW PIPELINE
APPROACH ROAD
PAVED STATE HIGHWAY 99
42" DIA. RIVETED STEEL PIPE (EXISTING)
PIER
BAY 8
940
950
960
970
980
990

10 0 10 20 30 40 50
SCALE OF FEET

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

GRANTS PASS DIVISION
ROGUE RIVER BASIN PROJECT, OREGON

SAVAGE RAPIDS DAM
SOUTH BANK
FISH PASSAGE IMPROVEMENTS

DENVER, COLORADO JANUARY 1994

DRAWING NO. 1313-D-4

Fish Ladders

Structures

Design of the new fish ladders at Savage Rapids Dam is based on drawings and specifications provided by USFWS and approved by NMFS. Although this design work was completed in the 1970's, USFWS and NMFS agree that the designs are adequate for cost estimating purposes.

The new ladders would be a vertical slotted-wall design that allows for self-regulation of flows, adequate resting areas for fish, and operation with nearly any flow. The design consists of 28 pools or cells that would be 8 feet wide by at least 10 feet long and up to 17 feet deep plus an entrance pool at the downstream end and an exit pool at the upstream end of the ladder. The entrance and exit of each ladder cell consist of a full-height vertical slot that is 15 inches wide (see Vertical Slot Fishways schematic). Although the vertical slots would not maintain a constant discharge, the ladders would provide fish passage over the range of riverflows. Under most operating conditions, there would be about 41 cfs of water passing through each fish ladder. Minimum water depth in each cell (measured at the vertical slot) would be about 6.8 feet. A level channel would lead from the last pool directly into the reservoir.

The ladder design (mirrored for the south and north banks) accommodates the lower pool elevation that is held between irrigation seasons. A level, 2-foot-wide channel with a floor elevation of 949.0 feet would extend from the reservoir along the side of the upper nine pools. This channel would enter the ninth pool from the upstream end via a slide gate.

The floor of each ladder would have a slope of 10:1 from the entrance pool at elevation 930.0 feet to the exit pool at elevation 958.0 feet. When the reservoir pool elevation is at maximum, the head loss between ladder pools would be approximately 1 foot (within NMFS criteria). Head losses between ladder pools would be proportionately less (and more desirable) with lower reservoir elevations.

Two slide gates, stoplogs, and trashracks to facilitate operation and maintenance would be located at the exit of the fish ladders (upstream end). These would be serviced by the existing monorail crane cableway.

Channels would be excavated from each fish ladder entrance and exit to the main channel of the river. These channels would allow fish to enter and exit the fish ladders during low river flows.

Dam bay No. 16 would be modified as part of the south fish ladder and would no longer function as a part of the dam spillway.

Attraction Flows

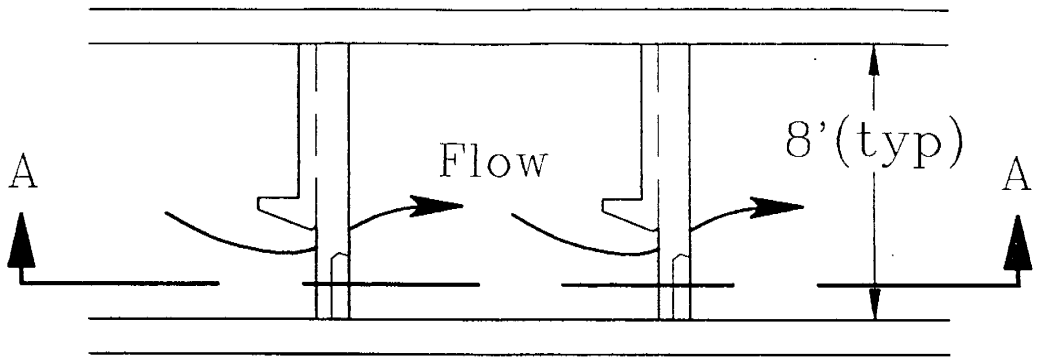
The hydraulic turbine discharge (approximately 800 cfs) would be routed to provide attraction flow for the north fish ladder during the irrigation season. These flows would discharge directly into the entrance pool through a diffuser screen which would smooth out turbulence and decrease velocities. Between irrigation seasons, flow would be released through the turbine sluice gates to the entrance pool to provide attraction flows. A slide gate on the south side of the entrance pool would be opened to help direct fish toward the fishway during periods when high riverflows passing over the spillway attract fish to the base of the dam. The entrance pool of the north ladder would have a floor elevation of 922.0 feet to accommodate and help reduce the turbulence of the turbine discharge flows.

Auxiliary attraction water for the entrance pool of the south fish ladder would be diverted through a baffle structure and diffuser screens before entering the downstream entrance pool. A semicircular pool with a 20-foot radius would be excavated to a minimum depth of 5 feet in front of the entrance pool to facilitate fish access. The entrance pool would be equipped with slide gates to provide control over the full range of expected riverflow conditions.

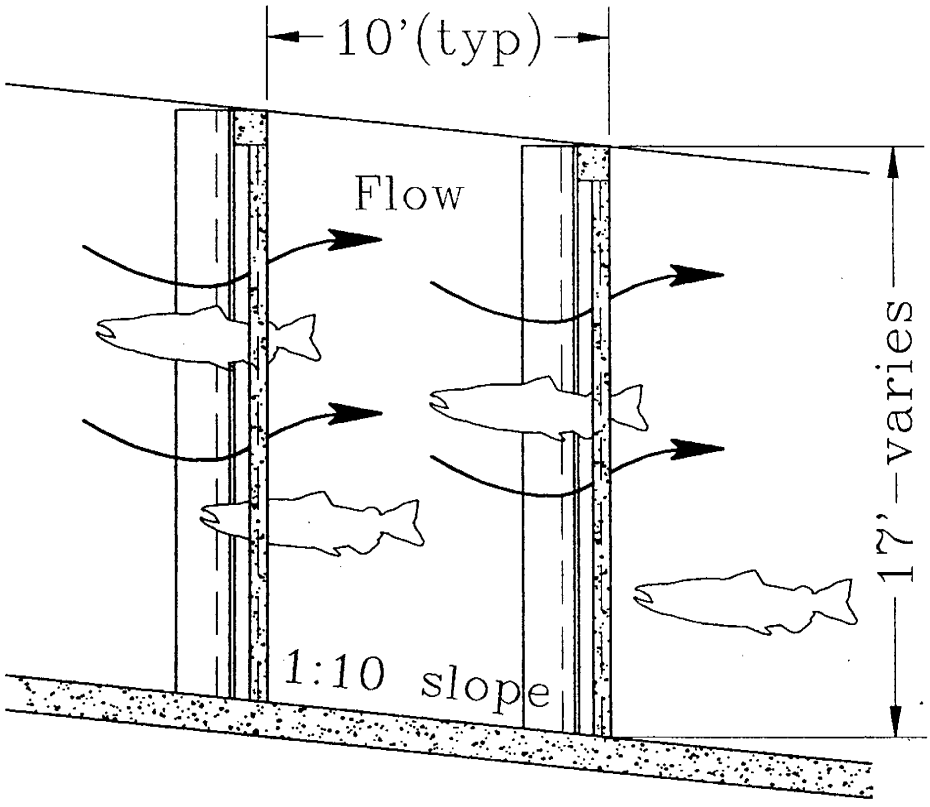
North Diversion

Vertical Fish Screens

The two existing vertical traveling fish screens on the north side of the dam would be removed, and the existing concrete support structure would be extended upstream approximately 75 feet and modified to accommodate the new screens. To help direct riverflows toward the structure, a short channel would be excavated toward the center of the river. Four new traveling fish screens would be installed at an angle of 30 degrees to riverflow (see Drawing No. 1313-D-3).



PLAN VIEW



SECTION A-A

VERTICAL SLOT FISHWAYS

Each screen unit would be 8 feet wide by 32 feet high (the same size as the present screen units) and would have a mesh with 1/8-inch clear openings. Velocity of the screen movement would be 10 feet per minute. Cleaning of screens would be accomplished in part by the sweeping flow across the screens and in part by a washing system that sprays water from behind and through the screens. The approach flow velocity (perpendicular to the screen face) would be a maximum of 0.4 feet per second. Sweeping flow (flow parallel to the screen face) would be approximately twice the approach velocity to help fish move along the screen surface to the inlet of the bypass. Fish would enter a 24-inch-diameter bypass pipe and exit next to the entrance of the fish ladder. Supporting piers for the screens would be flush with the face of the screen to optimize fish travel along the screen face and into the bypass inlet.

A new engine and electrical generator combination is included to operate the four screens in the event of power failure.

Turbines and Pumps

The existing turbine units along with the concrete/steel intake structures would be removed from the turbine room, and would be replaced with single-runner turbine units of conventional steel draft tube elbow intake and discharge cone configuration. These units are an inherently simpler design and present a relatively obstruction-free location in the turbine room. Each turbine would be equipped with a gear drive transmission to drive the horizontal, single stage, double-suction pumps which would pump the water into the Tokay and South Highline Canals. Pumps and hydraulic turbines are designed to provide a maximum pumping capacity of 32 cfs at 167 feet of dynamic head (Tokay Canal) and 59 cfs at 99 feet of dynamic head (South Highline Canal).

A new 28-inch-diameter steel pipe would be installed in the existing right-of-way to service the Tokay Canal, and a new 38-inch-diameter pipe would be installed to service the Highline Canal. Various gates, valves, hydraulic dampers, controls, and instrumentation would allow slow closing and throttling capabilities to meet varying diversion requirements.

Trashracks

New trashracks would be constructed at the entrance to the northside diversion to protect the vertical screens from large debris. Clear openings in the trashracks would be 10 inches wide by 24 inches high. Automatic trash rakes are not included in the design as initial investigation indicates that they would not be cost effective. Automatic trash rakes would be reevaluated during final design.

Stoplogs

Ten new, metal stoplogs would be provided to block off and dewater the north diversion facilities for routine maintenance and repair of the screens and hydraulic turbines. The stoplogs would fit into the slotted concrete piers of the two entrance bays. Each bay would hold five stoplogs which would be installed or removed separately by a traveling trolley hoist on an overhead monorail crane runway extending to the north bank. The stoplogs would be stored on the north bank.

Access Bridge

At present, vehicle access to the north side of the dam is through a locked gate and a private maintenance road that crosses the railroad right of way. This road would remain closed to the public for safety reasons.

A concrete bridge would be constructed to provide access for a mobile crane to lift the vertical screens for major repairs. Since use of a crane would be for short periods, a mobile crane would be rented as necessary and is not included as a capital expense. The 30-foot-wide bridge would be approximately 21 inches thick and span approximately 25 feet from the north bank to the vertical screen structure.

South Diversion

Gravity Canal

The headworks structure of the Gravity Canal would be modified for trashracks and stoplogs, and approximately 130 feet of the Gravity Canal between the headworks and the existing rotary drum screens would be lined with concrete. Existing openings in the canal to the fish ladder would be sealed, and the existing fish screen assembly would be removed and replaced.

Rotary Drum Screens

A bank of five rotary drum screens would be installed in the canal at an angle of approximately 15 degrees to canal flows. A new concrete structure would house the rotary drum screens. Each of the five rotary drum screens would be 5 feet in diameter and 12 feet long. Screen fabric would be a 4-mesh, 12-gauge stainless steel woven fabric with clear openings of 1/8 inch. The screens would be designed to operate within a submerged range of 70 to 80 percent of the screen diameter. Proper depth of flow would be maintained at the screens by use of the slide gates at the Gravity Canal headworks structure and by stoplogs downstream from the screens.

A 2-foot-wide bypass channel would lead from the screens to the south fish ladder; bypass flows could also be directed to the fish counting facility (see below). Sweeping flow velocity along the drum screen face would be about double the 0.4 feet per second flow velocity against the screen face. Maximum travel time for fish across the screen face is estimated at 2 minutes.

Included with the supporting structure for the screens is an overhead lifting frame, 3-ton hoist, motor, and drive mechanism to remove the screens during winter months and to do required maintenance work during the irrigation season. A 5-kW engine/generator combination would provide backup power to maintain drum operation in case of electric power failure.

Juvenile Fish Counting Facility

A juvenile fish counting facility similar to the design used at the Umatilla Project (Three Mile Falls Diversion Dam) would be constructed downstream from the fish screen. ODFW would operate the facility. During periods when juvenile fish are being counted, flows carrying juvenile fish would be directed to the counting facility before exiting to the fish ladder.

Bridge

The intent was to relocate an existing bridge that crossed Gravity Canal. To accomplish this, new concrete abutments would be constructed about 50 feet downstream from the old site. This bridge has since been removed from the site. A decision would be made during preconstruction on how to proceed.

Plunge Pool and Rock Excavation

A concrete-lined, plunge pool approximately 40 feet long by 70 feet wide and 10 feet deep would be constructed downstream from bays 8 and 9 of the dam. The plunge pool would provide a deep basin for fish to safely fall into if swept over the spillway portion of the dam. Irregular rock outcroppings below the plunge pool would be removed for more efficient and less turbulent flow.

Most of the rock area in the river channel in the vicinity of the existing south fishway would be excavated to elevation 933. This elevation is about 10 feet lower than the elevation of the middle of the rock area and would be below any tailwater elevation. Removing the rock would reduce turbulent flows below the dam and make it easier for the fish that come upstream along the south riverbank to find the attraction flow from the south fish ladder. Rock removal would also eliminate the stranding of fish in pools caused by rapid changes in water levels downstream from the dam.

Bay 8 and 9 Modifications

Spillway/Stoplogs

Replacement stoplogs for spillway bays 8 and 9 would be constructed with less depth than the four existing stoplogs to allow spills over the dam to be concentrated and directed into the new plunge pool. The most appropriate depth for the stoplogs would be determined during final designs. The stoplogs would be placed and removed by means of the existing electrically operated hoist and cableway located above the dam crest.

Crest Modification

Overflow shields constructed of steel plate would direct flow over the dam. The shields would be attached with pins to allow removal of the plates and stoplogs. These overflow shields would help pass fish gently over spillway section into the plunge pool. Final design of these structures would be coordinated with the USFWS and NMFS.

Radial Gates

The existing radial gates, which are nearing the end of their useful life, would be replaced. New seals, guides, gate hoists, control equipment, piping, and appurtenant facilities would be installed.

Access Road and Parking

The existing operation and maintenance access road on the right side (south) of the dam was never intended for public access and is unsafe. Parking is inadequate for the general public use that has developed at the south side of the dam. Features to improve the safety of the public using this access (to view migrating fish) would include a new paved access road from State Highway 99, culvert drain pipe, paved parking area, entry and walkway areas, and repairs and improvements to the existing bridge. Entry and walkway areas would be paved, have handrails, and meet handicap access requirements. The parking area would require a 2-inch asphalt layer over a 4-inch subbase. The access road would intersect State Highway 99 at a 90-degree angle, providing both improved and safer

access. The access road would conform to State highway specifications and include some grade improvements and surface paving. Data for the access road were provided by the Oregon Department of Transportation, Roseburg District Office.

Fish Viewing Platform

An educational fish viewing platform for public use would be located downstream on the left side of the south fish ladder and would be designed to accommodate handicapped persons. This platform would replace the existing fish viewing platform.

Interpretive signs would be developed for this site to explain fish passage and the opportunity to view fish. Signs would be constructed of durable material resistant to vandalism and extreme weather conditions. Specific sign size, type, design, text, and artwork would be developed during final designs.

Correction of Existing O&M Deficiencies

A 1990 Review of Operation and Maintenance report prepared by Reclamation identified many problems and inadequacies resulting from deferred maintenance over the years. By the end of 1992, 25-35 percent of the recommendations had been implemented. There remained 22 items that vary from highly specific actions to evaluation or establishment of general maintenance programs. These remaining items are included in the Dam Retention Alternative.

Three program items account for over 70 percent of the estimated total cost of corrections. These are: (1) replacement of four 4- by 6-foot slide gates, (2) establishment of a program to coat the stoplogs and replace the deteriorated seals, and (3) installation of a permanent lighting systems and permanent metal floor grates with fixed handrails within the dam gallery.

Many of the items relate to safety, e.g., removal of grease from floors and walls, replacement of existing wooden walkways and handrails with metal structures, adding handrails, providing signs, locking accessways, and fencing some areas.

Some of the items include establishing programs for training and preventive maintenance, inspection and annual maintenance of specific systems, and evaluation of current maintenance practices.

REMOVAL OF EXISTING FACILITIES

Removal of the existing fish ladders and other facilities to be replaced would be accomplished in the same manner as discussed for the Preferred Alternative. Waste materials such as concrete, wood, and steel, and excavated rock would be moved to a nearby landfill, and hazardous materials would be handled in accordance with existing Federal, State, and local laws.

CONSTRUCTION

A 6-year construction period was assumed for this alternative including 2 years of preconstruction activity and 4 years of actual construction. Facilities associated with irrigation would be completed during the first 2 years of actual construction, but fish passage facilities would not be completed until the final year. Delivery of irrigation water and passage of fish would not be interrupted during this period.

Construction Cost

January 1993 price levels were used in estimating construction costs. Construction cost factors include 10 percent for unlisted items, 25 percent for contingencies, and 30 percent for noncontract (indirect) costs. An allowance is included for contractor mobilization, preparatory work, and demobilization.

Since all construction activity would take place on existing GPID land or right-of-way, there would be no costs for land purchases or easements, with the exception of a small parcel of land needed to upgrade the intersection between State Highway 99 and the parking lot south of the dam. Estimated construction costs are shown in table IV-1.

Table IV-1.—Construction costs for the Dam Retention Alternative
(January 1993 price level)

Item	Cost
Fish enhancement	
River control—north side construction	$106,000
North fish ladder	3,410,000
Vertical fish screens	3,881,000
River control—south side construction	91,000
South fish ladder	2,070,000
Replace radial gates	1,856,000
Spillway/stoplogs	48,000
Removable dam crest overflow sections	560,000
Plunge pool	450,000
Downstream rock excavation	751,000
Gravity canal drum screens	792,000
Fish viewing platform	50,000
Access road/parking lot	110,000
Juvenile fish trap facility	611,000
Fish passage subtotal	$14,786,000
Irrigation	
North pipeline	344,000
South pipeline	465,000
Turbines and gearing	1,189,000
Pumps and remaining items	700,000
Correction of O&M existing deficiencies	150,000
Irrigation subtotal	$2,848,000
Total construction cost	$17,634,000

Materials

Sand, gravel, rock, and other raw materials for construction are readily available from commercial sources in the area.

Construction Schedule

To minimize construction effects on migrating fish, replacement and rehabilitation work performed on the dam, the fish ladders, and fish screens would be divided into two segments: (1) work on the north side of the dam which would be accomplished first and (2) improvements on the south side of the dam which would follow. This would assure that at least one fish ladder would be operational at all times.

To assure GPID's ability to maintain water deliveries, work that would affect GPID delivery of water would be performed between irrigation seasons.

Construction concerns including timing and in-river construction work are generally the same as for the Preferred Alternative (see Chapter III).

OPERATION, MAINTENANCE, REPLACEMENT, AND POWER

OMR&P Costs

Appraisal level cost estimates for annual OMR&P costs are based on Reclamation's experience with a similar facility (Three Mile Falls Diversion Dam, Umatilla River, Oregon). Adjustments were made to reflect conditions at Savage Rapids Dam. Actual power consumption to operate the facilities would not be significantly different from current usage. The operating season for irrigation facilities at Savage Rapids Dam is approximately 23 weeks per year and the fish ladders would be operated year round. Operation costs are based on an assumed amount of staff hours required to operate the facilities. Maintenance costs are based on assumed staff hours required to maintain the facilities in a reasonable manner. Replacement costs are based on the field cost of principal items multiplied by a replacement factor derived from Reclamation experience.

Power costs are based on the electric motor sizes appropriate for operation of dam maintenance equipment and the fish screens and an assumed number of hours of operation per day. These are the total power costs for dam and fish screen operation and are not incremental to current power costs. The long-term power rate for general energy consumption (as

opposed to the rate used for irrigation pumping) assumed for this estimate is $0.065 per kilowatt-hour. Table IV-2 summarizes OMR&P costs for the Dam Retention Alternative.

Table IV-2.—Annual OMR&P costs for the Dam Retention Alternative (January 1993 price level)

Item	OM&R	Power	OMR&P
Irrigation and fish passage			
North fish ladder	$10,000	$0	$10,000
Vertical fish screens	14,000	400	14,400
South fish ladder	10,000	0	10,000
Gravity canal drum screens	8,100	200	8,300
Access road/parking lot	200	0	200
North pipeline	300	0	300
South pipeline	200	0	200
Turbines and gearing	16,000	0	16,000
Pumps	10,000	0	10,000
Maintenance of dam facilities	25,000	200	25,200
Total irrigation and fish passage	$93,800	$800	$94,600
Juvenile fish trap facility	$10,000	$200	$10,200
Total	$103,800	$1,000	$104,800

Operation Schedule

Operation of facilities would generally remain unchanged, with the exception that both fish ladders would be operated year round. Irrigation diversion amounts and schedules would be the same as shown in table III-4, and the pool behind Savage Rapids Dam would continue to be raised at the beginning of the irrigation season and lowered at the end of the season.

ECONOMIC AND FINANCIAL ANALYSIS

Benefits

This alternative would produce nonconsumptive use benefits related to anadromous and resident fish increases and indirect or secondary benefits. Because these monetary benefits are difficult to calculate and minor compared to direct consumptive use benefits, they were not fully identified and not included in the economic analysis.

Monetary benefits of the Dam Retention Alternative in this analysis are limited to salmon and steelhead; monetary recreation and irrigation benefits were not identified. The fishery benefit is based on the concept that elimination of all loss would increase salmon and steelhead escapement by about 22 percent and that with the Dam Retention Alternative losses of about 5 percent would continue. That is, the Dam Retention Alternative would increase escapement by about 17 percent. A simple mathematical factor (17/22) was applied to all of fishery values derived for the Preferred Alternative (Table III-8).

Annual equivalent fishery benefit accruing to the Dam Retention Alternative would be $3,870,900. The annual equivalent benefit is based on a 20-year period, a 5-year build up, and a discount rate of 8 percent.

Costs

Project costs consisting of construction plus interest during construction total $21,343,000. Construction costs are based on a January 1993 price level and are shown in table IV-1. Interest during construction was calculated on the basis of a total 6-year construction period at the applicable Federal discount rate of 8 percent.

Annual costs including the annual equivalent of the project cost and the annual OMR&P accruing to the Dam Retention Alternative total $2,278,600. The annual equivalent of the project cost is based on a 1994 Federal discount rate of 8 percent over a 20-year period. Table IV-3 summarizes project and annual costs.

Table IV-3.—Project and annual costs for the Dam Retention Alternative

Item	Cost
Project cost	
Construction	$17,634,000
Interest during construction (8 percent over a 6-year period)	3,709,000
Total project cost	$21,343,000
Annual costs	
Annual equivalent of project cost[1]	$2,173,800
Annual operation, maintenance, replacement, and power	104,800
Total annual cost	$2,278,600

[1]Total capital costs annualized at 8 percent for a 20-year period

Benefit/Cost Analysis

A true benefit/cost analysis which compares annualized values for all of the costs to all of the benefits over the lifetime of the project was not made for this analysis. As with the Preferred Alternative, benefits and costs were annualized over a 20-year period instead of a 100-year period that is normally used for a project life. Other monetary benefits may be produced by the Dam Retention Alternative but were not identified for this analysis. The effects of this type of analysis on the benefit/cost ratio are the same as discussed for the Preferred Alternative.

For this analysis, benefits and costs were annualized over a 20-year period using the 1994 Federal discount rate of 8 percent. Annual equivalent benefits of $3,870,900 compare with annualized equivalent costs of $2,278,600 to produce a benefit/cost ratio of 1.7 to 1.

COST ALLOCATION AND REPAYMENT

A true cost allocation was not prepared. For this analysis all of the facilities and construction activities associated with fish passage, protection, counting, and viewing were assigned to an anadromous fish function. Remaining costs were assigned to the irrigation function. This results in capital costs of $14,786,000 assigned to an anadromous fish function and $2,848,000 assigned to the irrigation function.

Costs of fish protection facilities at Savage Rapids Dam have in the past been nonreimbursable. It is assumed for this analysis that all of the costs associated with the anadromous fish function would be Federal costs and nonreimbursable. Further it is assumed that all of the irrigation function costs would be privately financed, and no Federal funds would be involved.

FUNDING

For this analysis, it was assumed that capital costs assigned to the anadromous fish function would be federally funded and that those funds would be expended as needed. If federally funded, capital costs associated with the irrigation function would be reimbursable without interest under current Federal requirements. However, for this analysis, it was assumed that the irrigation function would be privately financed over a 30-year period at 6 percent interest. OMR&P costs associated with the juvenile fish trap facility would be assumed by the ODFW, and all other OMR&P costs would be paid by GPID.

Table IV-4 summarizes capital costs and the annual financial requirements of GPID and ODFW with the Dam Retention Alternative. GPID would continue to be responsible for existing debt to the United States. In mid-1994, this amounted to $290,525 (10 annual payments of $26,830 and a final payment of $22,225).

Table IV-4.—Annual payments

Item	Capital Cost	Annual Cost
GPID--Irrigation		
Irrigation capital costs	$2,848,000	[1]$207,000
All OMR&P (except fish trap facility)	--	94,610
Total of Dam Retention Alternative		$301,610
ODFW --Annual OMR&P (fish trap facility)	[2]$611,000	$10,200

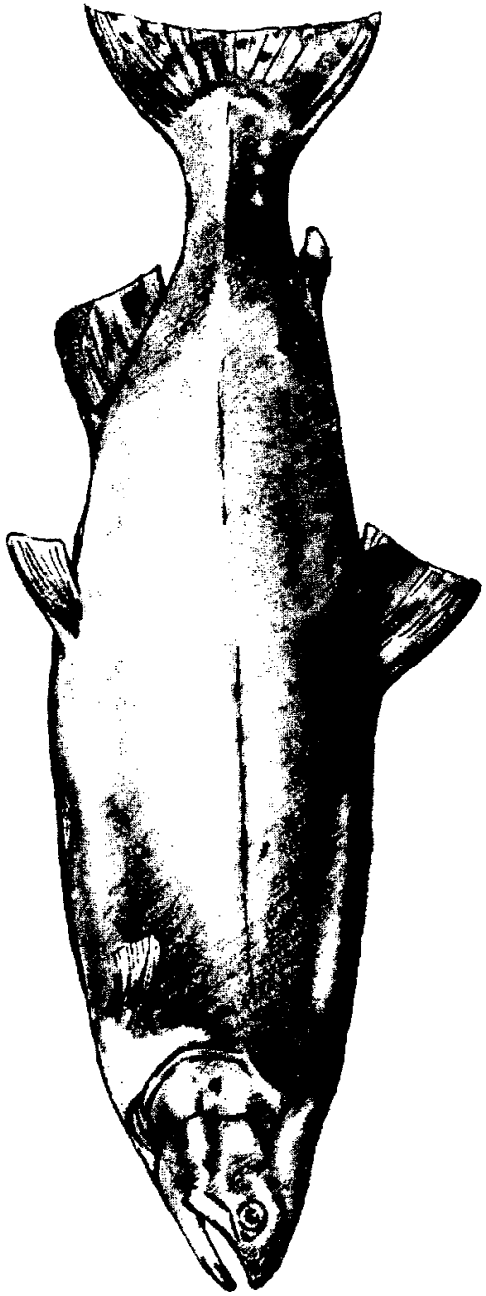
[1]Assumes private financing at 6 percent interest over a 30-year period.
[2]Included in Federal anadromous fish function cost.

PERMITS AND REGULATORY COMPLIANCE

Permit and regulatory compliance for the Dam Retention Alternative would be essentially the same as for the Preferred Alternative (see chapter III).

VIABILITY

The Dam Retention Alternative was found to meet the four criteria of viability--completeness, effectiveness, efficiency, and acceptability. (See "Formulation" chapter.) The Dam Retention Alternative includes all of the investment necessary to provide effective fish passage and protection with continued diversion of irrigation water. This alternative has a benefit cost ratio of 1.7 to 1 and is therefore cost effective. Although the Dam Retention Alternative is not as effective or as efficient as the Preferred Alternative, it is acceptable to most Federal, State, and local agencies. Some opposition is expected for any alternative, and this alternative is opposed by some fishery and environmental interests.



Chapter V—No Action Alternative

DESCRIPTION

The No Action Alternative is formulated (1) to establish anticipated future conditions including the needs expected to exist in the future and (2) to serve as a base for evaluation of action alternatives. Conditions that can be expected to exist in the future without implementation of any of the identified action alternatives are identified. These conditions are compared with the conditions expected with an action alternative to determine the potential net effects of an action alternative. Identification and evaluation of the No Action Alternative are required by NEPA.

For this study, the No Action Alternative assumes that the Bureau of Reclamation would neither act nor participate in an action to resolve fish passage problems at Savage Rapids Dam. However, the No Action Alternative does not assume that there would be an absence of all action. Continued loss of anadromous fish at Savage Rapids Dam is unacceptable to Federal, State, and local entities; private organizations; and many individuals. In addition, GPID is accountable for all the legal parameters specified by the State in GPID's temporary water permit. Two of those parameters are specifically directed at resolving the fish passage problems at Savage Rapids Dam. Without the current study and Federal funding, it is uncertain how these issues would be resolved.

Therefore, the No Action Alternative assumes that sometime in the future, fish passage problems would be resolved by some means. In the interim, anadromous fish losses would continue at the current or near the current level. The length of delay in implementing a solution would depend on the extent of legal intervention and the willingness of various entities to cost share in implementing a solution. It is possible that GPID's share of costs to implement a solution would exceed its income. If that happened, GPID would have to reorganize, combine with other entities, or cease to exist. Such action, or the threat of such action could result if there are further delays to implement a fish passage solution. If a species of Rogue River anadromous fish is listed under the ESA, it is likely that a passage solution would be implemented somewhat earlier under the direction of NMFS.

Several reasonable scenarios could be constructed to describe the future under the No Action Alternative. For this analysis, it has been assumed that anadromous fish losses at Savage Rapids Dam would continue at current or near current levels for up to 20 years.

ACCOMPLISHMENTS

Under the No Action Alternative, fish passage problems would remain essentially unchanged. There would be no significant change in salmon and steelhead escapement. From time to time malfunctions in fish passage and protective facilities would result in large losses of salmon and steelhead.

Irrigation diversion would remain essentially unchanged. Over time, malfunctions in equipment would cause more frequent interruptions in service while repairs are made.

FACILITIES

The existing fish passage and protective facilities and GPID diversion facilities would remain essentially unchanged (see description in Chapter 1). As facilities continue to deteriorate, more frequent and more extensive repairs and replacements would be needed. The costs to maintain these facilities would increase over time.

Facilities operation would remain unchanged (see chapter 1). However, increases in irrigation district assessments would be needed to fund increased costs of repairs and replacements. No attempt was made to determine possible cost increases.